

New synonyms and comments on *Phoradendron* (Viscaceae)

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ABSTRACT

Among the new species of *Phoradendron* proposed by Wiens and Hawksworth (2002 [2004]), *P. abietinum* Wiens, *P. flavomarginatum* Wiens, *P. hawksworthii* Wiens, and *P. sedifolium* Wiens are regarded as synonyms of *P. bolleanum* (Seem.) Eichler as circumscribed in Kuijt (2003). *P. acuminatum* Wiens is a later homonym of *P. acuminatum* Kuijt, and is thus illegitimate. *P. rufescens* Wiens becomes a synonym of *P. tetracarpum* Kuijt; *P. olivae* Wiens is similarly referred to *P. minutifolium* Urban, *P. chazaroi* Wiens to *P. dipterum* Eichler, and *P. durangense* Wiens to *P. falcifer* Kuijt. An amended description, illustration, and neotype are provided for *P. calvinii* Wiens. Published on-line www.phytologia.org *Phytologia* 97(3): 246-251 (July 1, 2015). ISSN 030319430.

KEY WORDS: *Phoradendron abietinum*, *P. acuminatum*, *P. bolleanum*, *P. calvinii*, *P. chazaroi*, *P. durangense*, *P. flavomarginatum*, *P. hawksworthii*, *P. olivae*, *P. sedifolium*, Viscaceae.

The main purpose of the present contribution is an evaluation of the new species of *Phoradendron* (Viscaceae) that were published in an article (Wiens & Hawksworth 2002[2004]¹) shortly after the appearance of my monograph of the genus (Kuijt 2003). However, I take this opportunity to make a couple of other related comments and to add a new synonym of my own.

The northern reaches of this large, mainly tropical and subtropical genus show a bewildering polymorphy and are therefore difficult to deal with taxonomically. This is true for the leafy species now named *Phoradendron leucocarpum* (Raf.) Rev. & M. C. Johnst. (Abbott & Thompson 2011) as well as for the nearly squamate assemblage of species related to *P. juniperinum* Engelm., and especially for the complex that I united under the name of *P. bolleanum* (Seem.) Engelm. – a complex that geographically reaches from Guatemala to southern Oregon. It is especially in Mexico that the latter alliance produces taxonomic problems, and it is here that most of the new species described by Wiens and Hawksworth are located.

A few general comments on that complex are relevant. The unranked name *Pauciflorae* has been used for it, as a subunit of subgenus *Boreales* Trel. ex Engler, originally including the *P. juniperinum* assemblage as a separate, unranked unit “*Aphyllae*” parallel to the unranked “*Bolleanae*” in which group several of the Wiens & Hawksworth species are nested. However, I have shown (Kuijt 2003) that both “*Boreales*” and “*Pauciflorae*” are unacceptable categories both nomenclaturally and taxonomically. While a great deal of diversity of leaf shapes and sizes is included in my concept of *P. bolleanum*, the male and female inflorescences are essentially uniform throughout, providing the main rationale for the one-species concept. It is also true that there is a virtually unbroken gradient of leaf shapes and sizes. The Wiens and Hawksworth article strongly diverges from my view in this regard; additionally, it also recognizes *P. pauciflorum* Trel. and *P. saltillense* Trel., species that I synonymized under *P. bolleanum*. Two further Trelease names not accounted for by Wiens & Hawksworth but similarly belonging to the

¹ The heading of Aliso 21(1) reads “2002”, but the actual date of publication was 11 February, 2004.

alliance are *P. tequilense* Trel. and *P. guadalupense* Trel., both also being synonymized in my monograph. I should finally point out that the concept of *P. bolleanum* as used by those authors does not agree with its type specimen as seen in Trelease's Fig. 19a (the fragment), as on p. 37 of their paper they speak of leaves being oblong to occasionally sub-oblongate, with a rounded to obtuse apex, the blade dorsiventrally flattened. The leaves of the type specimen of *P. bolleanum*, in reality, are very different.

With respect to the synonymies proposed below that refer to elements of the *P. bolleanum* complex, I wish to reiterate from my monograph that I do not deny the possibility that a more detailed study of this baffling polymorphic alliance might not result in a more structured and nuanced taxonomic presentation requiring the revival of some names, perhaps at the subspecific level. Unfortunately, the new species proposed by Wiens & Hawksworth do not contribute to such a resolution.

Other features are often adduced by Wiens and Hawksworth to support their species concepts. Color variation, however, is an unreliable feature, as exposure to the sun and possibly hosts may influence this factor. The appearance and size of the plant, or the length of its internodes, could well be an expression of the host's vigor. In other words: local differences may well exist, but their taxonomic use requires detailed field confirmation. The hosts of most species of the assemblage are mainly Cupressaceae. Wiens and Hawksworth are careful in listing host records where available, but imply limitations that simply have not been demonstrated. For example, the occurrence of "*P. abietinum*" on *Abies durangensis*, as found in "only a few widely scattered localities" might conceivably represent occasional transfers from other nearby hosts. The occurrence on *Abies*, by itself, is not necessarily a reliable indication of taxonomic distinction; such a host has been recorded as far north as northern California (Kuijt 2003). Notwithstanding a coniferous preference, dicotyledonous hosts such as *Mahonia*, *Quercus* and *Umbellularia* have also been documented (Kuijt 2003).

Epiparasitism

Three new species in Wiens and Hawksworth's article are said to be epiparasitic, and some comments on this topic are therefore warranted. The phenomenon of epiparasitism (i.e., parasitism of one species of mistletoe on another) is well documented in Viscaceae, especially in *Dendrophthora* (Kuijt 1961) and *Phoradendron* (Kuijt 2003). The most prominent group of epiparasites is found in some half dozen species centered around *P. dipterum* Eichler. It may well be an exclusive condition in some species, but this fact is difficult to document. In addition to the (perhaps exclusive) epiparasitism in the *P. dipterum* alliance, we occasionally find the phenomenon in species not normally epiparasitic. My view on Wiens and Hawksworth's statements on the collection labels that refer to "Obligate" epiparasitism is that these facts are unproven; all that may be said is that the specimens collected were parasitic on other mistletoes. This is particularly relevant in *P. calvinii* and *P. durangense*; *P. chazaroi* is clearly a small form of the variable and widespread epiparasitic *P. dipterum*.

1. *Phoradendron abietinum* Wiens, Aliso 21(1): 37. 2002 [2004], *syn. nov.*

Wiens et al. 5230, holotype US!; isotype RSA!, MEXU!, MO! Coll. 1975.

Paratype: *Wiens & Hawksworth* 4422, MO!

= *Phoradendron bolleanum* (Seem.) Eichler.

P. bolleanum, in the limited sense of Trelease (See his Fig. 19a, the fragment) is cited there from Durango as well as Texas and Chihuahua, and is reported from both *Juniperus* sp. and *Arbutus arizonica*. The leaf shape of *P. abietinum* corresponds exactly to that of the Seemann type of *P. bolleanum*.

2. *Phoradendron acuminatum* Wiens, Aliso 21(1): 37--38. 2002 [2004], *nom.*

illeg., non *P. acuminatum* Kuijt (2003).

Wiens & Hawksworth 4396, holotype US!; isotype RSA! Coll. 1969. Notwithstanding the listing in Wiens and Hawksworth, there are no isotypes at MEXU or MO.

The above specimen corresponds to the type of *P. bolleanum* (Seem.) Eichler.

3. *Phoradendron flavmarginatum* Wiens, *Aliso* 21(1): 38. 2002 [2004], *syn. nov.*

= *Phoradendron bolleanum* (Seem.) Eichler.

Wiens 7779; holotype US!; isotypes MEXU!, MO! Coll. 1995.

4. *Phoradendron hawksworthii* Wiens, *Aliso* 21(1): 38--39. 2002 [2004], *syn. nov.*

= *Phoradendron bolleanum* (Seem.) Eichler.

Hawksworth, Lightle & Lampi 1044; holotype US!; isotype RSA! Coll. 1967.

5. *Phoradendron olivae* Wiens, *Aliso* 21(1): 39-40. 2002 [2004], *syn. nov.*

= *Phoradendron minutifolium* Urban.

Wiens, Hawksworth, Cházaro, & Oliva 7051; holotype IBUG; isotype FPF.

Paratypes: *Cházaro et al. 4479*, IBUG; *De la Rosa, Villareal & Tamayo 1677*, IBUG.

The mensural differences between *P. olivae* and *P. minutifolium* are too slight to warrant specific distinction, and fall comfortably within the description of the latter species in Kuijt (2003). In fact, the type of *P. olivae* was already listed there under *P. minutifolium*, which is also known from Coahuila and Chihuahua.

As discussed in Kuijt (2003: 124 & 303), there are known hybrids between *P. juniperinum* and *P. densum* that are remarkably similar to *P. minutifolium*. It is not impossible that some of the known populations reported for the latter species are of a similar origin.

6. *Phoradendron rufescens* Wiens, *Aliso* 21(1): 40. 2002 [2004], *syn. nov.*

= *Phoradendron tetracarpum* Kuijt.

Wiens, Hawksworth, Bailey & Mathiasen 5244; holotype US!; isotypes FPF, RSA! MO! Coll. 1975.

Because of the fact that the US sheet designated by Wiens as holotype (US 3685160, image 01268625) bears two separate specimens, one a female and the other a male, the present International Code of Botanical Nomenclature requires the selection of a lectotype (Art. 9.9, Note 3). (Dr. K. Gandhi (GH) considers that the combination should be regarded as the validly published holotype, and reports that a proposal to cover such cases will be made for the next Code. However, because of the uncertainty of its acceptance, I consider the (herewith) designation of the male (upper right) element as lectotype justified provisionally.)

It is fortunate that the US material of *P. rufescens* includes both a fruiting and a male specimen, allowing for the recording of some missing information for *P. tetracarpum*. The species is profusely branched. Male inflorescences consist of two fertile internodes each; a fertile bract on the proximal fertile internode subtends as many as 10 flowers, and about 5 on the much smaller distal internode. Flowers are regularly triseriate and orange-brown in color. Fruits are 4--5 mm in diameter and reddish-pink. The species appears to be limited to the southern portion of the Sierra Madre Occidental; collections are now known from Hidalgo, Querétaro, and San Luis Potosí.

7. *Phoradendron sedifolium* Wiens, *Aliso* 21(1): 40-41. 2002 [2004], *syn. nov.*

= *Phoradendron bolleanum* (Seem.) Eichler.

Wiens, Hawksworth, Player & Hermann 5012; holotype US!; isotype RSA!

Notwithstanding the statement in the protologue, no isotype exists at MO. Coll. 1975.

8. *Phoradendron calvinii* Wiens, Aliso 21(1): 41. 2002 [2004]. – Type: Mexico. Jalisco, Mpio. Minatitlán, Cerro Grande, 18 km N of Colima Hwy. on Rd to Terrero, elevation 2060 m, *Wiens 7774* in 1995. The holotype is stated to be at US, with isotypes at IBUG, MEXU, UC, FPF, MO, RSA.

The holotype at US as well as the isotypes at MEXU, MO, and UC are missing, and I have not been able to resolve the issue at IBUG and FPF. A neotype therefore needs to be designated. Since Wiens, in 2012, (erroneously) annotated all four of these sheets as “type specimens”, it is appropriate to follow his intent, and *Wiens 7781* is herewith designated as neotype:

Mexico. Jalisco. Minatitlán. Sierra de Mammitlán, Cerro Grande, Rd. from El Sauz to Terrero, 1 km SW of Terrero. 1950 m, 6196 ft. 1 Oct 1995, *D. Wiens & C. L. Calvin 7781*. Neotypes at MEXU!, MO!, UC!, US! and presumably at FPF and RSA. “Obligate epiparasite on several other species of *Phoradendron*.”

Wiens & Calvin 7781 is not listed in the protologue of *P. calvinii* but, as stated above, was erroneously annotated as the *P. calvinii* “type” by Wiens, as annotated by John Boggan at US. *P. calvinii* is said to be similar to “*P. calyculatum*”, a superfluous name for what is now known as *P. falcatum* Eichler; see the discussion in Kuijt (2003: 193).

It should be noted that *Wiens 7774* and *Wiens & Calvin 7781* have different collection data, showing that the confusion is not due to a simple numerical error.

Amended description -- Large, leggy plants said to form pendulous masses to 2 m long, short-bristly on all parts, especially on major leaf veins. Internodes to 11 cm long, terete when fresh, finely grooved when dry, somewhat keeled and expanded distally; basal cataphylls absent; lowest foliar organs on laterals in median position; prophylls inconspicuous. Leaf blade narrowly ovate, tapering distally to a narrowly rounded apex, to 14 cm long and 5 cm wide, base contracted into 1--1.5 cm long petiole. Venation palmate, conspicuous, with 5 major veins, the outer pair reaching into the mid-leaf area, the central three reaching the apex or nearly so. Dioecious, the neotype female; male plant not seen. Inflorescences axillary; peduncles of female inflorescence ca. 10 mm long, terete, followed by 2 or 3 fertile internodes, the lowest one ca. 1.5 cm long, the distal one less than half as long; flowers ca. 45 per (main) fertile internode, which is densely golden-bristly on all parts, completely ensheathed by the crowded flowers, these without evident seriation. Back of petals with long bristles, but ovary essentially glabrous.

The male inflorescence is stated by Wiens to be narrow, reaching 9--11 cm in length, with 3--5 fertile internodes. Fruits are said to be 3 mm in size, white. The host was stated to be *Phoradendron longifolium* Eichler ex Trel., which ranges from Oaxaca to Sonora (Kuijt 203). However, the (female) neotypes seen have inflorescences no more than 2 cm long, consisting of only 2 or 3 fertile internodes. It is entirely possible, as is the case with some other species, that the mature male inflorescence is much longer, in accordance with Wiens' description.

P. calvinii appears to be a close relative of the widespread *P. falcatum* Eichler, resembling it in its epiparasitism, lack of basal cataphylls, and in the crowded condition of the numerous flowers on fertile internodes. The two species differ in leaf morphology and venation, length of inflorescences and, most strikingly, in the indumentum of especially the flowers in *P. calvinii*, *P. falcatum* being glabrous.

9. *Phoradenron chazaroi* Wiens, Aliso 21(1): 41--42. 2002 [2004], *syn. nov.*
= *Phoradendron dipterum* Eichler.

Wiens, Cházaro, Hawksworth & Oliva 7047; holotype US!; isotypes MEXU!, MO!, RSA! Coll. 30 July 1989.

10. *Phoradendron durangense* Wiens, Aliso 21(1): 42. 2002 [2004], *syn. nov.*

= *Phoradendron falcatum* Eichler.

Wiens & Calvin 5993; holotype US!; isotypes MO!, RSA! Coll. 1985.

P. durangense appears to be but a stout *P. falcatum* as defined in my monograph. The former's protologue is in substantial agreement with my description and illustration (Kuijt 2003, Fig. 100) even though the leaves of *Wiens & Calvin 5993* are somewhat wider. The authors also refer to *P. durangense* as having large, pendulous masses 2 m or more in length, and being parasitic on *P. longifolium* Eichler ex Trel., again in agreement with *P. falcatum*. *P. falcatum* has not previously been reported for southern Durango but its presence there is scarcely a surprise.

11. *Phoradendron galeanum* Kuijt, Syst. Bot. Monogr. 66: 212--213, 2003, *syn. nov.*

This species was described on the basis of a single, slender-leaved specimen collected in Nuevo León. It was subsequently realized that it corresponds to *P. lanceolatum* Engelm., which ranges from Oaxaca to Nuevo León, its type also being derived from the latter state, and it is herewith regarded as a synonym of *P. lanceolatum*. The species is one of the most northerly cataphyllous members of the genus except for *P. californicum*, in which the occurrence of cataphylls is irregular (Kuijt 1997).

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LITERATURE CITED

- Abbott, J. R. and R. L. Thompson. 2011. New combinations in *Phoradendron leucarpum* (Viscaceae). J. Bot. Res. Inst. Texas 5(1): 139--141.
- Kuijt, J. 1961. A revision of *Dendrophthora* (Loranthaceae). Wentia 6: 5--145.
- Kuijt, J. 1997. *Phoradendron olae* Kuijt, a new species from Mexico pivotal in the taxonomy of the genus, with comments on *P. californicum* Nutt. Brittonia 49: 181--188.
- Kuijt, J. 2003. Monograph of *Phoradendron* (Viscaceae). Syst. Bot. Monogr. 66: 1--643.
- Trelease, W. 1916. The genus *Phoradendron*. Univ. of Illinois Press, Urbana.
- Wiens, D. 1964. Revision of the acataphyllous species of *Phoradendron*. Brittonia 16: 11--54.
- Wiens, D. and F. Hawksworth. 2002 [2004]. New species of *Phoradendron* (Viscaceae) from Mexico and Guatemala and a synopsis of species in section Pauciflorae. Aliso 21(1): 33--43.

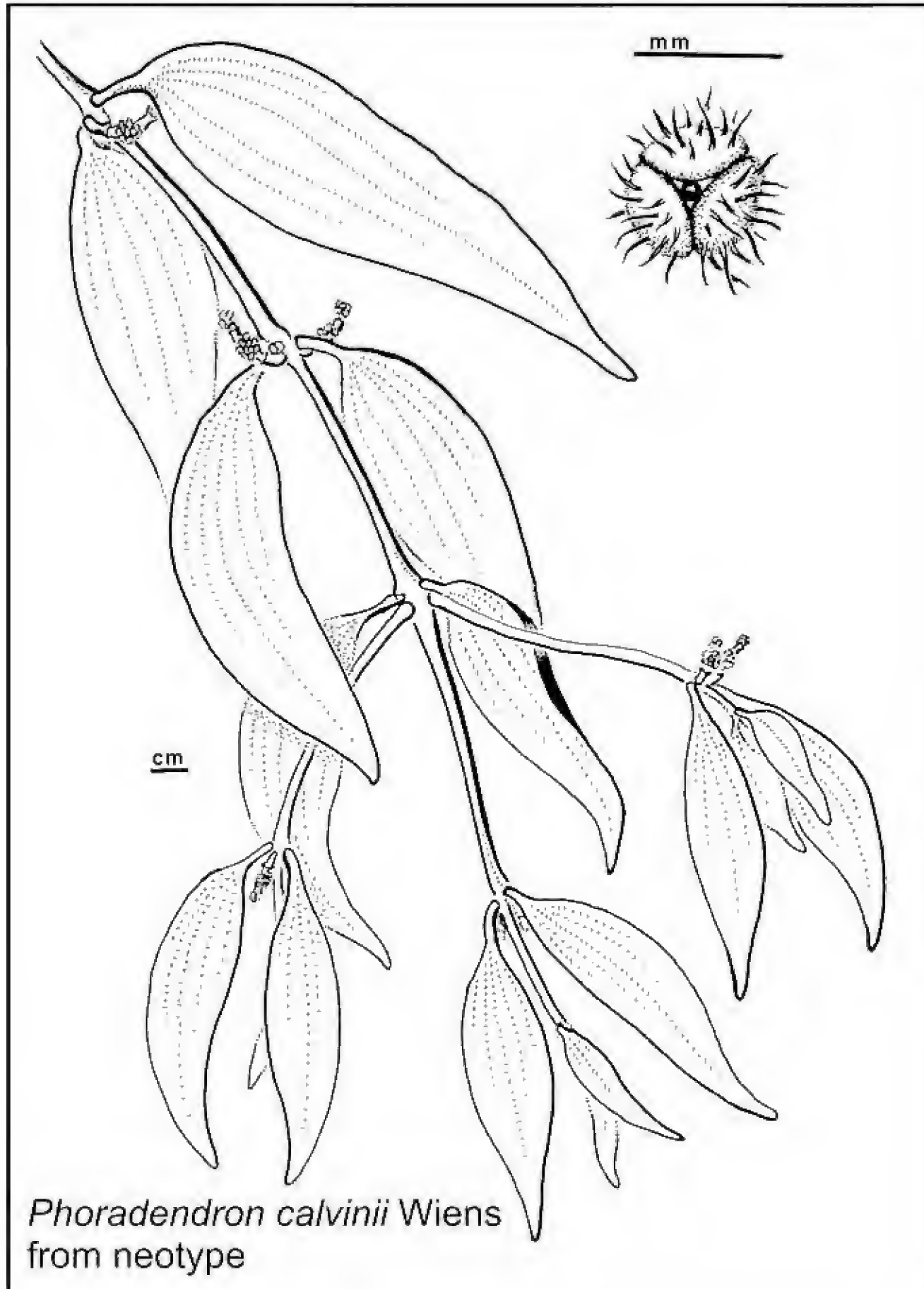


Fig. 1. *Phoradendron calvinii* Wiens (UC neotype). Habit and enlarged flower.